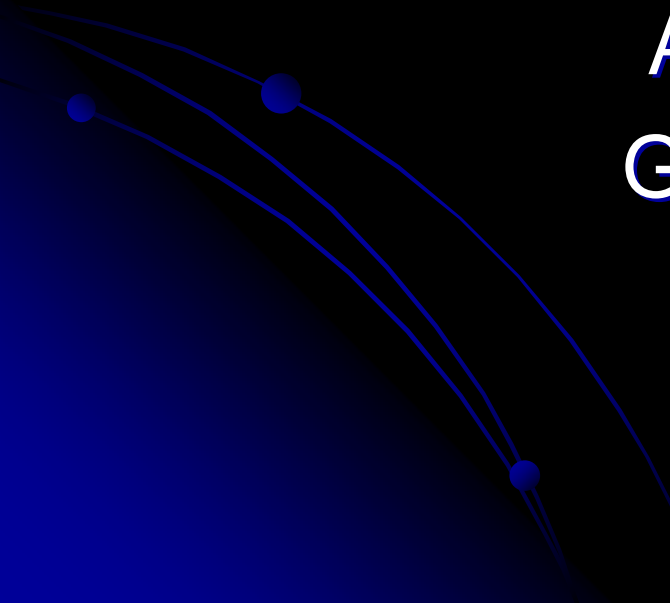


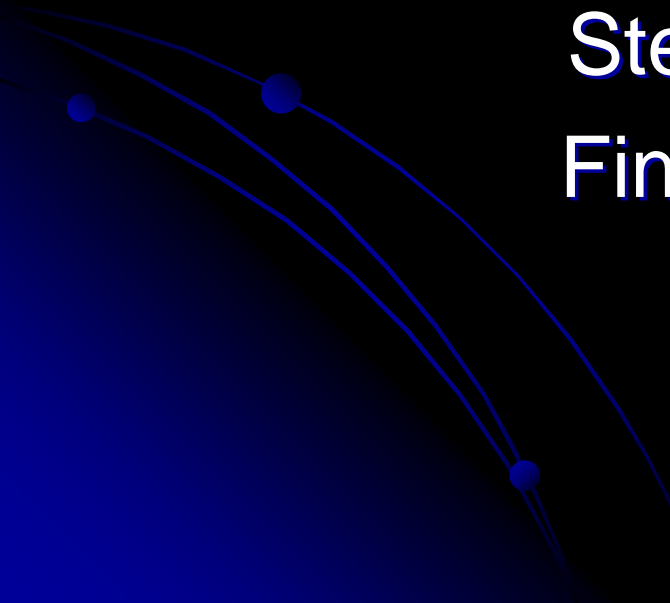
NIST LATENT TESTING WORKSHOP

April 5 – 6, 2006
Gaithersburg, MD



LATENT PRINT EXAMINATIONS

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NIST Latent Testing


Hooray!



The Benefits

- More individuals identified...
- More information in support of criminal investigations...
- More perpetrators identified...
- More cases solved...
- More information in support of intelligence investigations...
- More crimes prevented...
- More persons processed thru security checks...
- QUICKER

NIST Latent Testing

- What is our scope?
 - What is our objective?
 - What is our focus?
 - What are our assumptions?
 - What are our limitations?
- 

THE (starting) SCENARIOS

- **1. Starts at the crime scene with investigators (non-latent print examiners)**
 - Without remote AFIS capability
 - With remote AFIS capability
- **2. Starts at the crime scene with latent print examiners**
 - Without remote AFIS capability
 - With remote AFIS capability
- **3. Starts at the laboratory with latent print examiner**
 - Starts at AFIS evaluation phase

THE (starting) SCENARIOS

- 4. Biometric application for security check processing.
 - No latent examiner available
 - Latent examiner available
- 5. Large volume cold case filtering.
 - Large number of cases backlogged?
 - Large number of latent prints in a case?

THE (ending) SCENARIOS

- 1. At the crime scene with investigators (non-latent print examiners)
 - AFIS latent lights-out; who makes the ultimate decision (based on what) to arrest/apprehend or take another course of action - ?
 - Verification ?
 - Bias related issues
 - Who testifies, to what, in court?
- 2. At the crime scene with latent print examiners
 - AFIS latent lights-out
 - AFIS latent with assist
 - Verification ?
 - Bias related issues

THE (ending) SCENARIOS

- 3. At the biometric check station

- Immediate action?
- Secondary processing?
- Investigative / intelligence lead?

- 4. Latent case load management filtering

- Which cases to place manpower towards?
- Which latent prints to focus on first?

The Potential

- Use AFIS latent “lights-out” for performing decision with latent prints and elimination prints, suspect prints?
 - How well will this work for direct comparisons instead of searching a large repository?
- Is this a general probability statement algorithm for any latent print comparison?
- What about latent print exclusions?
 - Are we only including what makes an “ident”?
 - Or, will we also include the exclusion (“non-ident”)?

NIST Latent Testing Workshop

- Maintaining a Perspective -

- Name of the Test
 - NIST Latent Testing
 - NIST AFIS Latent Testing
- Define “lights-out”
 - Input only
 - Input and search (parameters)
 - Input, search and conclusion
 - Input, search, conclusion, and verification
- Define “quality”
 - “AFIS latent quality” versus “Case latent quality”

NIST Latent Testing Workshop

- Scope for Testing -

- Latent Prints...
 - From corresponding area of a rolled 10-print?
 - From corresponding area of a flat impression?
 - From the extreme finger tip areas?
 - From the finger lower joints?
 - From the palm prints?
 - From the extreme sides of the palms

NIST Latent Testing Workshop

- Scope for Testing -

- Latent prints vs. 10-print records
- Latent prints vs. less than 10-print records
- Latent prints vs. Unsolved latent prints
- Latent prints vs. palm prints
- Latent prints vs. Complete Friction Ridge Exemplars (old major case prints)

NIST Latent Testing Workshop

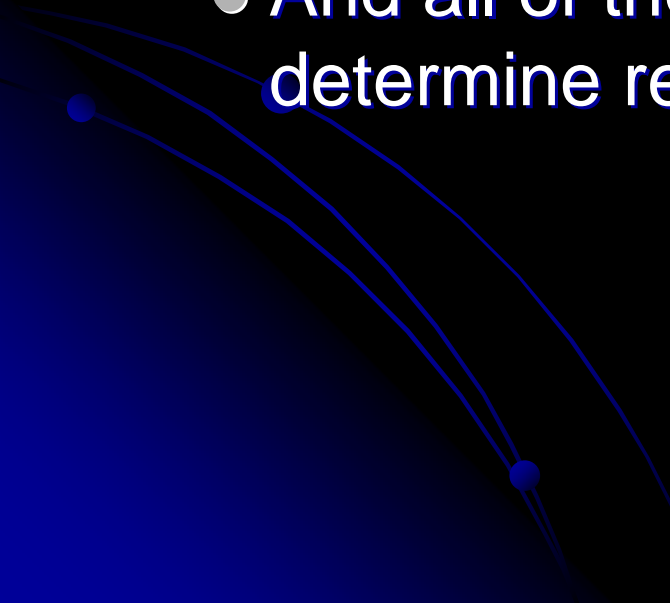
- Scope for Testing -

- Filtering

- Latent print classification?
- Latent print orientation?
 - Upright; degree of rotation tolerance
- Latent print area correspondence?
 - Left delta, above core, etc.
- Latent print finger designator?
 - E.g. definitely impression from right thumb
- Physical descriptors?
- Geographical limitations?

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- Scope for Testing -

- Statistical significance
 - How many samples (latent prints)?
 - How large of a repository?
 - And all of the other issues needed to determine reliability / confidence in results.
- 

Big Picture

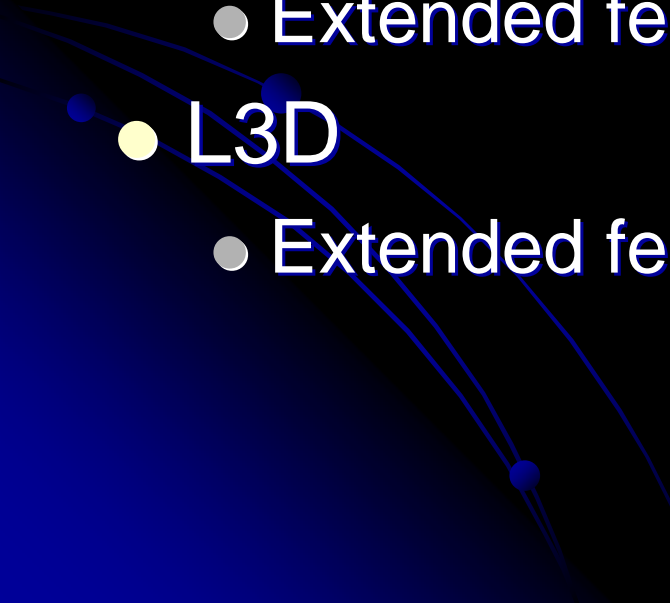
- Need to design these tests to answer the technical questions, as well as maintain perspective to the operational and judicial issues.

Let's go for it!

Image Acquisition

- Quality
 - Both latent prints and known exemplars
 - Capture resolution / compression
 - Automatic image enhancement
- Distortions
 - Automatic adjustments
- Processing techniques
 - Light sources
- Biometric scanners

Feature Extraction

- L1D
 - Classification, orientation, finger position
 - L2D
 - Minutiae (type 9 record)
 - Extended feature set
 - L3D
 - Extended feature set
- 

Test Sets

- NIST Special DB 27
- FBI special purpose data bases being created for specific latent print research purposes (Daubert related)
 - Black Box Study
 - Simultaneous impressions
 - Quality metrics
 - Quantity metrics
 - Extended Features
- Need for close non-mates

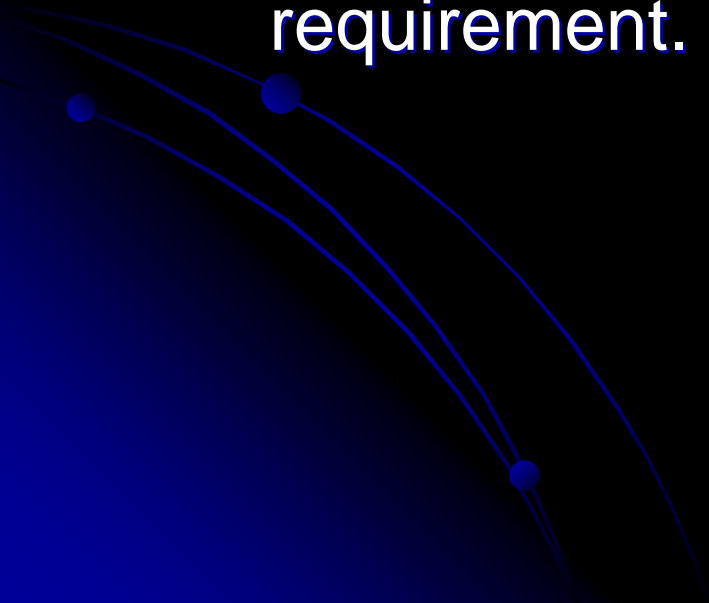
Test Sets

- Controlled test sets vs. case work
- Multiple test sets:
 - Initial proof of concept test sets
 - Test sets
 - Validation test sets
- Increase range of image quality (good, bad and ugly needs extended)
 - No value for comparison
 - No value for identification, but good for exclusion
 - No value for 'traditional AFIS' searching
 - Equivalent to high quality known exemplar

Test Sets

- Known exemplars
 - Sufficient (duplicate) samples from various recording techniques
 - Ink
 - Live-scan
 - Various resolutions / compressions
 - Various technologies
 - ?
 - Controlled qualitative aspects
 - Acquisition or post-processing

Test Sets

- Human subject volunteers
 - All of the issues that come along with this requirement.
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Conclusion

- It is time to commit to do this.
 - Latent print performance gains have huge potential.
 - Understand consequences to operational and judicial processes.
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